What is claimed is:

1. A method of processing an optical element having a spherical surface, the method using light beams of a spherical beam type, the spherical beam type including beams having one of substantially spherical wave fronts and substantially plane wave fronts, the method comprising:

providing a first interferometer apparatus having an interferometer optics, wherein the interferometer optics comprises an aspherical lens configured to transform a beam of a first spherical beam type into a beam of a second spherical beam type, the aspherical lens having at least one aspherical surface;

arranging the optical element in a beam path of an incident beam of a third spherical type provided by the interferometer optics;

interferometrically taking a first measurement of first wave fronts generated by reflecting the incident beam from the spherical surface of the optical element; and

determining first deviations of the spherical surface of the optical element from a target shape thereof in dependence of the first measurement;

wherein the method further comprises:

arranging the aspherical lens in a beam path of a measuring beam provided by a beam source of a second interferometer apparatus such that the measuring beam passes the aspherical lens and is reflected from a

reflecting surface, wherein the measuring beam, between the aspherical surface and the reflecting surface, is one of the first spherical type and the second spherical type;

interferometrically taking a second measurement of second wave fronts generated by reflecting the measuring beam from the reflecting surface; and

determining second deviations of the at least one aspherical surface of the aspherical lens from a target shape thereof in dependence of the second measurement.

2. The method according to claim 1, wherein the reflecting surface is provided on an optical element separate from the aspherical lens.

3. The method according to claim 1, wherein the reflecting surface is provided by a surface of the aspherical lens opposite to the at least one aspherical surface thereof, for reflecting the measuring beam having passed the aspherical surface of the aspherical lens.

4. The method according to claim 1, wherein the interferometer optics further comprises a Fizeau lens having a concave substantially spherical surface providing a Fizeau surface of the first interferometer apparatus.

5. The method according to claim 4, wherein the aspherical lens provides the Fizeau lens, wherein the Fizeau surface is provided by a surface of the aspherical lens opposite to the aspherical surface.

6. The method according to claim 1, further comprising:

machining the aspherical surface of the aspherical lens in dependence of the second deviations.

7. The method according to claim 6, wherein the machining is only performed if the second deviations exceed a predetermined threshold.

8. The method according to claim 1, further comprising:

applying an anti-reflective coating to the aspherical surface of the aspherical lens.

9. The method according to claim 1, further comprising:

machining the spherical surface of the optical element in dependence of the first deviations.

10. The method according to claim 9, wherein the machining is only performed if the first deviations exceed a predetermined threshold.

11. The method according to claim 9, wherein the taking of the first measurement, the determining of the first deviations and the machining of the spherical surface are repeatedly performed.

12. The method according to claim 1, further comprising:

finishing the spherical surface of the optical element.

13. The method according to claim 12, wherein the finishing comprises applying a coating to the spherical surface.

14. The method according to claim 13, wherein the coating comprises at least one of a reflective coating, an anti-reflective coating and a protective coating.

15. The method according to claim 1, wherein the spherical surface of the optical element has a k-value less than about 0.8.

16. The method according to claim 1, wherein the spherical surface of the optical element has a k-value less than about 0.7.

17. The method according to claim 1, wherein the spherical surface of the optical element has a k-value less than about 0.6.

18. The method according to claim 1, wherein the spherical surface of the optical element has a k-value less than about 0.55.

19. A method of processing an optical element having a spherical surface, the method using light beams of a spherical beam type, the spherical beam type including beams having one of substantially spherical wave fronts and substantially plane wave fronts, the method comprising:

providing a first interferometer apparatus having an interferometer optics, wherein the interferometer optics comprises an aspherical lens configured to transform a beam of a first spherical beam type into a beam of a second spherical beam type, the aspherical lens having at least one aspherical surface, the at least one aspherical surface having been interferometrically measured using a beam of one of the first sperical beam type and the second spherical beam

type to determine that second deviations of the at least one aspherical surface from at least one corresponding target aspherical shape are less than a predetermined value;

arranging the optical element in a beam path of an incident beam of a third spherical type provided by the interferometer optics;

interferometrically taking a first measurement of first wave fronts generated by reflecting the incident beam from the spherical surface of the optical element; and

determining first deviations of the spherical surface of the optical element from a target shape thereof in dependence of the first measurement.